Application No. 09/599,963
June 28, 2005
Reply to office action of March 28, 2005

Remarks/Arguments

Applicant gratefully acknowledges the thorough Examination to date and has made an effort to fully respond to all the issues raised by the Examiner. Reconsideration of the application in view of the previous amendments of May 30, 2005 and following remarks is respectfully requested.

Rejection of Claim 22 under 35 USC 102

The Examiner has objected to Claim 22, under 35 U.S.C. 102(b), as being anticipated by the U.S. Patent Number 5,563,875, issued to Hefel et al.

The Examiner states:

"Re Claim 22, fig. 4 teaches a Node A (common node) sending signals to Node B & C (first and second) to measure the round trip delays (See col. 6, lines 6-38) to compute the transmit time, wherein the RTD (round trip delay) between Node A and B halved indicates interim transit time (jitter in transit delay) and RTD between Node A and C halved; fig. 6 step 67 teaches calculating the link transmit times between source Node A to destination Node C, whereby by adding the interim transit times indicates the total transmit time to the destination (See col. 7, lines 50-65)."

However, the Examiner further states:

"Re Claim 22, Applicant argues that the "jitter is an additional calculation based on a previous calculation". However this limitation is not claimed. Furthermore, by adding all the intermediate transmit times between the source and destination indicates the total transit time (the total jitter) is calculated."

To reiterate, Applicant respectfully disagrees with the rejection based on the Hefel et al. patent. Applicant respectfully submits that the Hefel al. patent is primarily concerned with testing networks to identify bottlenecks in the network. More particularly, the Hefel et al. patent discloses a method of calculating link delays between nodes in a data network by sending wrap-around route testing messages along a "pre-calculated route". Hefel et al. further discloses that this pre-calculated route must be determined prior to sending the wrap-around route testing messages. The determination of the pre-calculated route ensures that the plurality of wrap-around route testing messages are sent to each node along the pre-calculated route. The present invention does not require such knowledge to send signals along the communication path.

PAGE 5/10 * RCVD AT 6/28/2005 2:11:20 PM [Eastern Daylight Time] * SVR:USPTO-EFXRF-1/2 * DNIS:8729306 * CSID:613 563 9231 * DURATION (mm-ss):09-04

Rather, the present invention assumes that a path between the start node and the end node is available. According to the present invention, there may be several communication paths available between a start node and an end node, as shown in Figure 3 of the subject application. The present invention does not require pre-calculating that path prior to sending signals to each of the nodes along that path. Thus, the teachings of the present invention are fundamentally distinguished over the prior art. This is manifested in that the Examiner has allowed Claims 1-5.

Nonetheless, with specific reference to the present rejection of Claim 22, the Hefel et al. patent is narrowly focused on testing communication paths in a network rather than determining jitter between nodes in a network as provided by the present invention. Indeed the Hefel et al. patent does not discuss the calculation of jitter in its disclosure. For this reason alone, the Applicant respectfully submits that the rejection of Claim 22 is unfounded.

Nevertheless, Applicant has amended claim 22 to more clearly define the invention as follows:

> "A method of determining a total jitter between a start node and an end node in a network, the method comprising:
> a) determining interim jitters in transit delays between adjacent nodes based on a communications path between the start node and the end node;
> b) calculating the total jitter based on transit delays previously calculated between the start node and the end node by adding up the interim jitters."

The Examiner has apparently interpreted the interim transit time between Nodes A and B (half of the round trip delay) as constituting "jitter in transit delays", or that effectively, the jitter is equivalent to the just measured transit delay. The jitter calculated in the present invention is not such a concept, but rather jitter in transit delays is based on "multiple determinations of transit delay between two nodes", as detailed in the original specification of the present invention on page 11, lines 21-24. This was presented in Applicant's response to the Office Action dated November 9, 2004. The Examiner correctly noted that this feature was not present in Claim 22 presently on file. Accordingly, Applicant has now amended this Claims to include this specific limitation.

PAGE 6/10 * RCVD AT 6/28/2005 2:11:20 PM [Eastern Daylight Time] * SVR:USPTO-EFXRF-1/2 * DNIS:8729306 * CSID:613 563 9231 * DURATION (mm-ss):09-04

Therefore, Applicant does not provide that "the transit time is the jitter", as stated by the Examiner, but rather that total jitter is an additional calculation based on previous calculations of the transit delay (refer to page 11, lines 21-24). Based on the Examiner's comments, Applicant believes that Claim 22 as currently amended is now allowable.

Rejection of Claims 13 through 21 under 35 USC 103

The Examiner has objected to Claims 13 through 21, under 35 U.S.C. 103(a), as being unpatentable over U.S. Patent Number 5,563,875, issued to Hefel et al., in view of U.S. Patent Number 6,405,337, issued to Grohn et al., and further in view of U.S. Patent Number 4,569,042, issued to Larson.

The Examiner states:

"Re Claims 13, 18, Hefel teaches in fig. 4, a Node A (common node) sending signals to Node B (first and second) to measure the round trip delays to compute the transmit time (See Abstract & col. 5, lines 46+) wherein the total transit time calculated is the total jitter between adjacent nodes wherein the measurement can be analyzed to localize congestion or identify failed resources.

Hefel fails to explicitly teach that the transmit delays are measured at different times. However, Grohn teaches that repeated round-trip measurement are performed because the round-trip delay over the communications network can change over time, hence repeatedly measuring the transit time would have reflected the condition of the network (See col. 5, lines 10-15). Therefore, one skilled in the art would have been motivated to measure the transit delay at different times to adaptive to the current condition of the network. Hefel also fails to explicitly teach calculating a jitter among the plurality of time delay measurements and determining if the jitter exceeds a predetermined threshold value. However, Larson teaches a difference calculator 204 and the delay calculator wherein the value of the estimated one-way delay computed by the delay calculator 205 is compared with a value of a predetermined maximum acceptable one-way delay (See col. 7, lines 34-68). One skilled in the art would have been motivated by Larson to compare the jitter with the predetermined threshold value to determine whether the route is acceptable or reliability (claim 18). Therefore, it would have been obvious to one ordinary skilled to combine the teaching of Grohn into the teaching of Hefel.

Re Claims 14, 19, refer to Claim 13, fig. 4, wherein Node A (a common node) transmits and receives a wraparound message 44 to Node B (the first node) wherein Node A to determine the RTD and halved to determine the transmit time (Steps a-c, g) in view of Grohn, Node A repeats the wraparound test to determine the transmit time in another time period, whereby by subtracting the repeated wraparound test between the same node would indicate condition of the path [J(A,D,t)=D(A,D,t2) – D(A,D,t1)].

PAGE 7/10 * RCVD AT 6/28/2005 2:11:20 PM [Eastern Daylight Time] * SVR:USPTO-EFXRF-1/2 * DNIS:8729306 * CSID:613 563 9231 * DURATION (mm-ss):09-04

Re Claim 15, refer to Claim 22, wherein adding the determined interim transmit time to calculate the total transmit time between the source and destination.

Re Claim 16, 17, fig. 4 is a hierarchical network and is a portion of the mesh network, i.e., SNA (See col. 1, line 60) wherein the subnetworks are form between the nodes, i.e., Node A to Node B & Node A to Node C.

Re Claim 20, Node A is directed connected to Node B.

Re Claim 21, Node C is indirectly connected to Node A."

However, the Examiner further states:

"Re Claim 13, 19, Applicant argues that the "jitter...measures the variance of the delay" as described in the Specification. However, this limitation is not claimed."

Applicant respectfully disagrees with the rejection under 35 U.S.C. 103 in that neither the Hefel et al. patent, nor the other two cited references teach the calculation of jitter. As previously presented in reference to Claim 22, the Hefel et al. patent does not disclose nor teach the calculation of jitter. This belief is supported by the Examiner in his rejection. Furthermore, the Grohn et al. patent relates to a system and method for adjusting a timeout for message transmission based on measured round-trip communication delays. As such, the Grohn et al. patent does not teach the calculation of jitter in accordance with the present invention, whereby jitter is calculated based on "measuring a variance of the plurality of transit delay measurements". The original specification of the present invention provides at page 14, lines 2-9, that "[s]uch variance, whether long term or between two measurements can be used as a measure of the quality of communication between nodes...[b]ecause the variance is essentially a measure of the extent a transit delay may deviate from the mean transit delay, by comparing this variance with a predetermined threshold, one can measure how bad the delay can be". The present invention provides a jitter calculation based on measuring a variance of the plurality of transit delay measurements. This is not taught nor fairly suggested by the Grohn et al. patent. Finally, the Larson patent teaches a difference calculator 204 and a delay calculator 205, neither of which are directed to jitter calculation based on a measure of the variance of the plurality of transit delay measurements. The Larson teaching cited by the Examiner of a "delay calculator 205 ...compared with a value of a predetermined maximum acceptable one-way delay" does not constitute the calculation of jitter based on a measure of the variance of the transit delay measurements as taught and claimed in the subject application. Therefore, Applicant

PAGE 8/10 * RCVD AT 6/28/2005 2:11:20 PM [Eastern Daylight Time] * SVR:USPTO-EFXRF-1/2 * DNIS:8729306 * CSID:613 563 9231 * DURATION (mm-ss):09-04

respectfully submits that the difference calculator and the delay calculator taught by the Larson patent do not provide a means for calculating jitter based on a measure of variance as taught in the present invention. Therefore, Applicant believes that none of the cited prior art references either taken alone or in combination disclose the calculation of jitter based on a measure of the variance in the transit delay measurements.

While Applicant argued that page 1 of the Specification teaches that the "jitter...measures the variance of the delay", Applicant admittedly did not provide such limitation in independent Claims 13 and 19. However, in light of the Examiner's comments, Applicant believes that these Claims would have been deemed allowable had this limitation been provided in the Claim. Thus, Applicant has amended Claims 13 and 19, to more clearly define the present invention over the cited prior art, as follows:

"13. A method of determining the quality of communications between two nodes in a network, the method comprising:

a) measuring a transit delay between the two nodes at different times resulting in a plurality of transit delay measurements;

b) calculating a jitter among the plurality of time delay measurements based on measuring a variance of the plurality of transit delay measurements; and

c) determining if the jitter exceeds a predetermined threshold value."

19. A method of determining a jitter between two transit delay measurements between two nodes, the method comprising:

calculating the jitter based on

$J(A,D,t) = D(A,D,t2) - D(A,D,t1))$

where

J(A,D,t) is the jitter between the two transit delay measurements based on measuring a variance of the two transit delay measurements;

D(A,D,t1) is one of the two transit delay measurements taken at time t1;

D(A,D,t2) is the other of the two transit delay measurements taken at time t2; and

A and D are the two nodes between which the transit delay is measured.

Accordingly, Applicant respectfully submits that independent Claims 13 and 19, and corresponding dependent Claims 14 through 18, and 20 through 21, in providing the calculation of jitter based on a measure of the variance of transit delay measurements, are patentable over

PAGE 9/10 * RCVD AT 6/28/2005 2:11:20 PM [Eastern Daylight Time] * SVR:USPTO-EFXRF-1/2 * DNIS:8729306 * CSID:613 563 9231 * DURATION (mm-ss):09-04

the Hefel et al. patent, the Grohn et al. patent, and the Larson patent, either taken alone or in any combination.

Applicant respectfully submits that all of the Claims presently standing in the application are patentably distinguished from the teachings of all references of record either taken alone or in any combination.

Allowable Subject Matter

The Examiner has allowed Claims 1 through 5, and 23 through 26 as the prior art fails to teach the method of determining total processing overhead delay between a first node and a second node, and the step of calculating the jitter based on J(A,B) formula. Applicant is in agreement with the findings of the Examiner.

Conclusion

Applicant respectfully submits that the outstanding rejections under 35 USC 102 and 103 have been overcome by way of previous amendment and remarks above. Applicant respectfully submits that all of the claims presently standing in the application are patentably distinguished from the teachings of all references of record either taken alone or in any combination. Accordingly, reconsideration and allowance of this application is respectfully solicited.

Should any further fees or payments be necessary for entry of this amendment and further prosecution of this application, the undersigned hereby authorizes the Commissioner to debit and/or credit our Deposit Account No. 16-0600.

Respectfully submitted

June 28, 2005
Date

Dennis S. K. Leung
Reg. No. 47 325
Tel: (613) 232-5300 (ext. 209)
Fax: (613) 563-9231

SHAPIRO COHEN
P.O. Box 3440, Station D
Ottawa, Ontario
Canada, K1P 6P1